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FILING DATE: *November 18, 2003*

RELATED PCT APPLICATION NUMBER: *PCT/US04/38759*

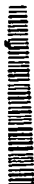


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PROVISIONAL APPLICATION COVER SHEET

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Sir:

This is a request for filing a PROVISIONAL APPLICATION under 37 CFR 1.53(c):

Atty Docket Number: 10987-015			
INVENTOR(S)/APPLICANT(S)			
Last Name	First Name	M.I.	Residence (City, State/Foreign Country)
Liskow	Karl	J.	Ypsilanti, Michigan
<input type="checkbox"/> Additional inventors are being named on separately numbered sheets attached hereto.			
TITLE OF INVENTION (280 characters max)			
PASS-THROUGH GAGE			
CORRESPONDENCE ADDRESS			
Eric J. Sosenko, Esq. BRINKS HOFER GILSON & LIONE P.O. Box 10395 Chicago, IL 60610 USA (734) 302-6000			
ENCLOSED APPLICATION PARTS (check all that apply)			
<input checked="" type="checkbox"/> Specification: 5 pages		<input type="checkbox"/> Small Entity Assertion	
<input checked="" type="checkbox"/> Drawing(s): 11 sheets		<input type="checkbox"/> Other (specify):	
METHOD OF PAYMENT (check one)			
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- ☒ No.
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Respectfully submitted,

Eric J. Sosenko (Reg. No. 34,440)

- ☒ Attorney/Agent Of Record
☐ 37 C.F.R. 1.34(a)

Date

Nov. 18, 2003

PROVISIONAL APPLICATION FILING ONLY

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PASS-THROUGH GAGE

SUMMARY

The gage of the present invention is designed to measure multiple diameters on a workpiece without the need for special part fixturing. It is particularly useful as a post-process gage after a workpiece has been ground in an infeed centerless grinding process or other grinding process.

DRAWINGS

Figures 1-3 illustrate the present invention with a workpiece located in both the received position and a workpiece located in the gaging position. For convenience and clarity, the part handling slide and the end plates of the gage are omitted in these views;

Figures 4-6 are similar to Figures 1-3, but with the slide and endplates being shown, and illustrate the workpiece as it is just being passed through the gaging position;

Figures 7-9 are similar to Figures 4-6 and show the workpiece at its takeout position after having passed through the gaging position; and

Figures 10 and 11 illustrate the part handling slide and support rails, absent the remainder of the gage.

DESCRIPTION

A workpiece enters the gage via an inclined chute allowing the workpiece to slide along the chute by gravity or other means. Upon entering the gage, it comes to rest on a shallow vee-block. At this point the workpiece is detected by a proximity sensor located at the low end of the vee-block.

A part handling slide, with appropriately shaped soft tooling, pushes or pulls the workpiece laterally from this location in the vee-block to pass the workpiece through the gage. The workpiece is continuously moved or passed through the gage by the slide. As the workpiece is being passed through the gage, readings of workpiece's diameter are taken.

The gage itself consists of carbide rails provided at two locations under the part. The locations are chosen to support the part near each end. Spaced above and opposing these rails at each location is a gage block subassembly. The gage block subassembly includes a pivoting contact backed by a common pencil probe. The gage block subassembly will produce diameter readings at each location as the workpiece passes between the rails and contacts and affects a displacement of the contact and the probe. Peak values at each location are recorded by the software in the gage electronics to determine the desired attributes of the workpiece.

The gage fixture itself includes two or more of the gage block subassemblies located opposite the support rails. The gage block subassemblies are assembled into the fixture at the desired locations with a series of appropriately sized shims that are sized and spaced to create a gage assembly that matches the geometry or desired location of measurement of the workpiece. These same shims also support a pivot shaft that is common to all of the pivoting contacts of all the gage block subassemblies. The entire stack of shims and gage block subassemblies are held together by drawbolts that pass through the assembly from end plates located at each end of the stack. The end plates can also support the carbide rails.

Each gage block subassembly has an adjustable spring to set the contact force of the contact to a value that stabilizes the workpiece precisely as it is passed through the gage. With the part so stabilized, it is also possible to place, as suggested above, additional gage block subassemblies at locations other than those directly opposing the rails. These additional gage block subassemblies will also generate useful diameter readings that may be used for verifying the amount of taper, hourglass, or barrel profile that may exist along the part. It is noted that this can only be achieved by assuming certain attributes of the workpieces processed by the grinding process. Specifically, the runout and out of round values must be small in relationship to the diameter tolerance being measured.

The gages located at some distance from either of the two support rails are actually measuring the radial distance from the true centerline of the part as it sits on the rails. Because of this, the gage electronics must compensate these readings by a factor generated from the geometric information obtained by the two gages opposing the support rails. For instance, if both support diameters fall near the minimum workpiece size tolerance, the actual centerline of the workpiece will pass through the gage at a height lower than that of a mean sized part by an amount equal to half of this tolerance. All of the gages that have no support rail under them must be compensated by this amount to arrive at a true reading. The gage electronic software can readily accomplish this task.

CLAIM

I claim:

1. A gage assembly for measuring a workpiece, said gage assembly comprising:

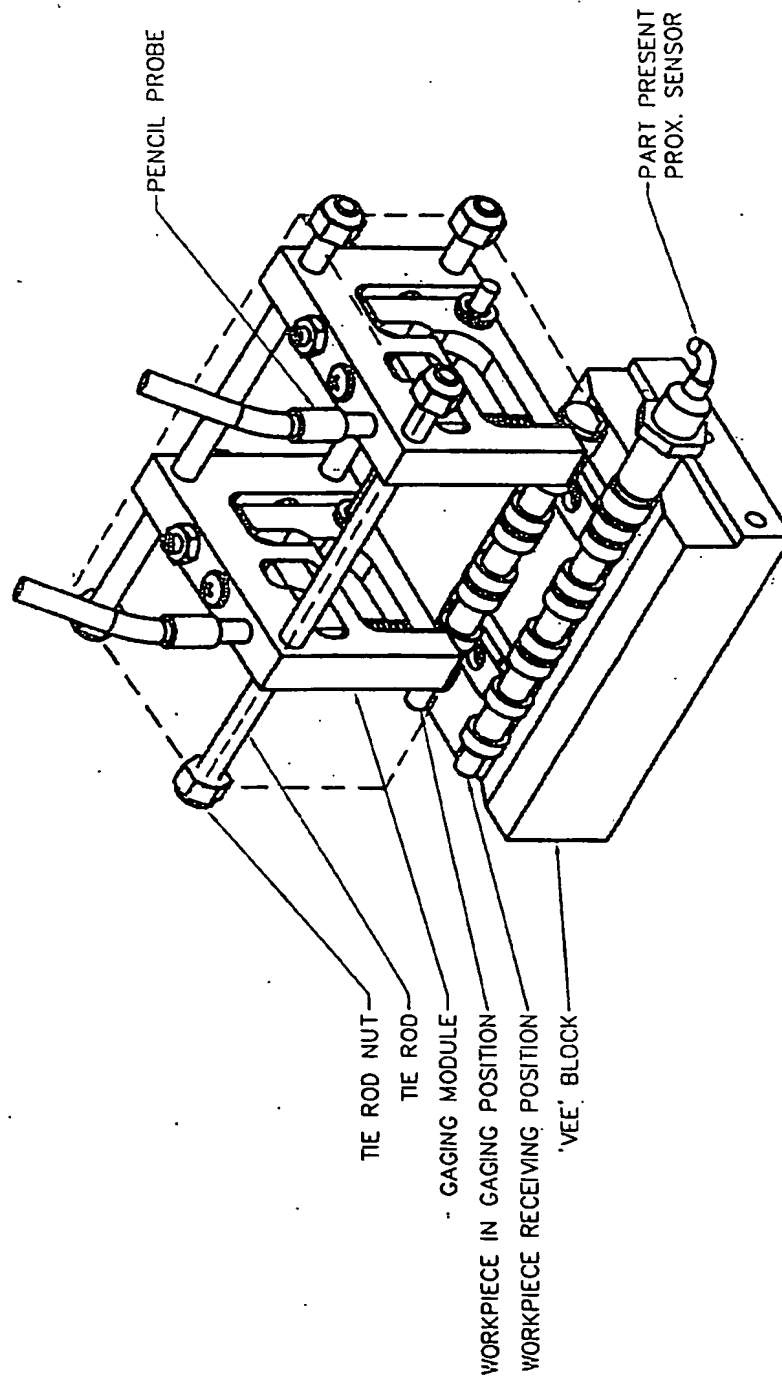
at least one support member;

at least one gage block subassembly having a contact located in spaced relation from said support member, said gage block subassembly also including a measuring device coupled to said contact; and

a part handling member coupled to an actuator, said actuator adapted to manipulate said part handling member whereby the workpiece is passed between said support member and said gage block subassembly.

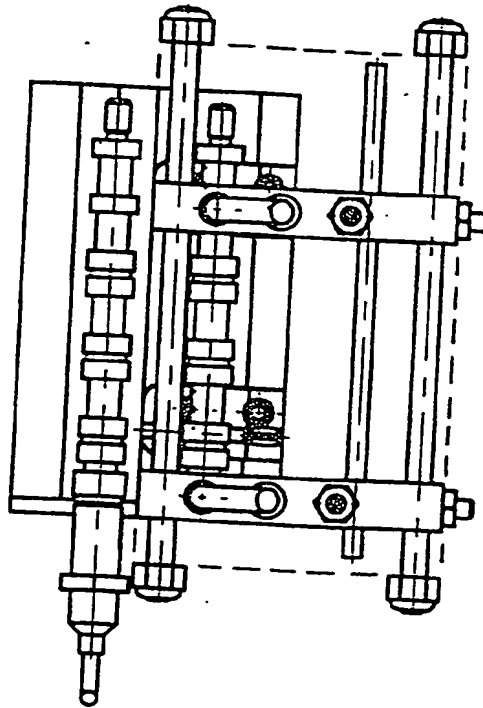
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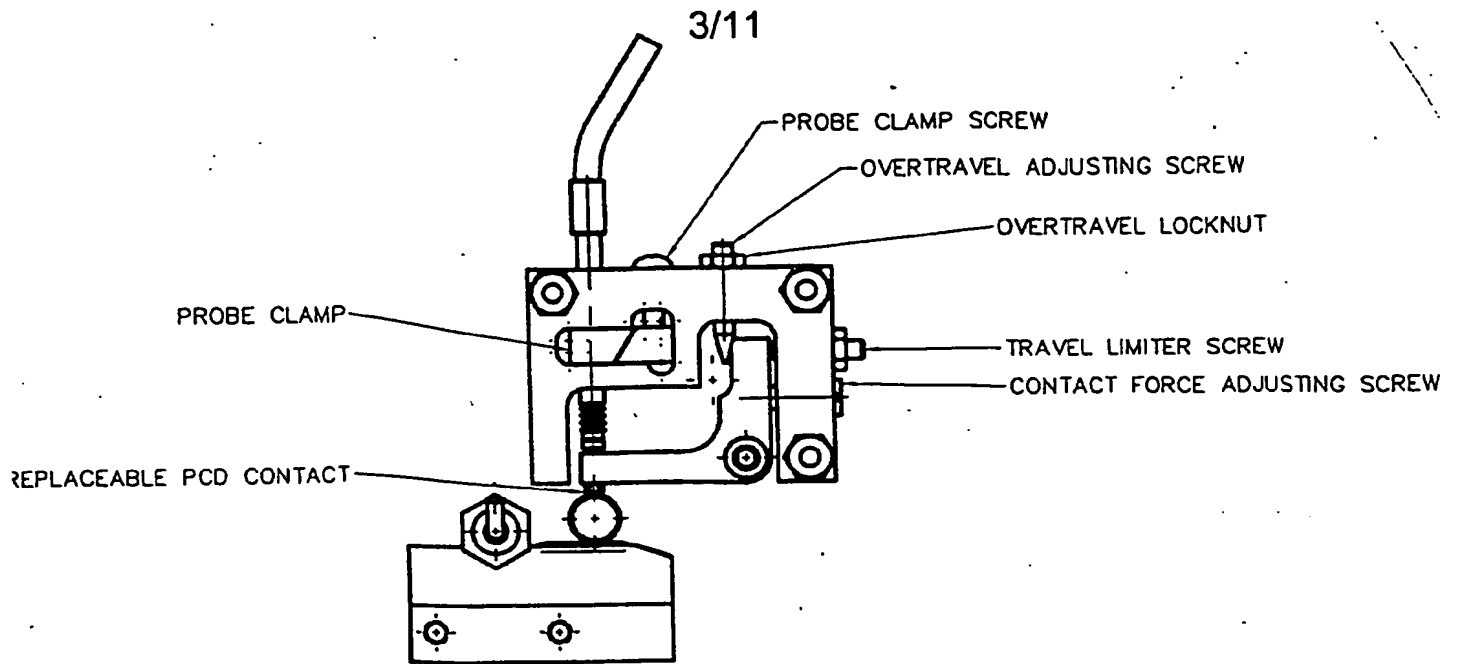
Fig. 1



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FIG. 2



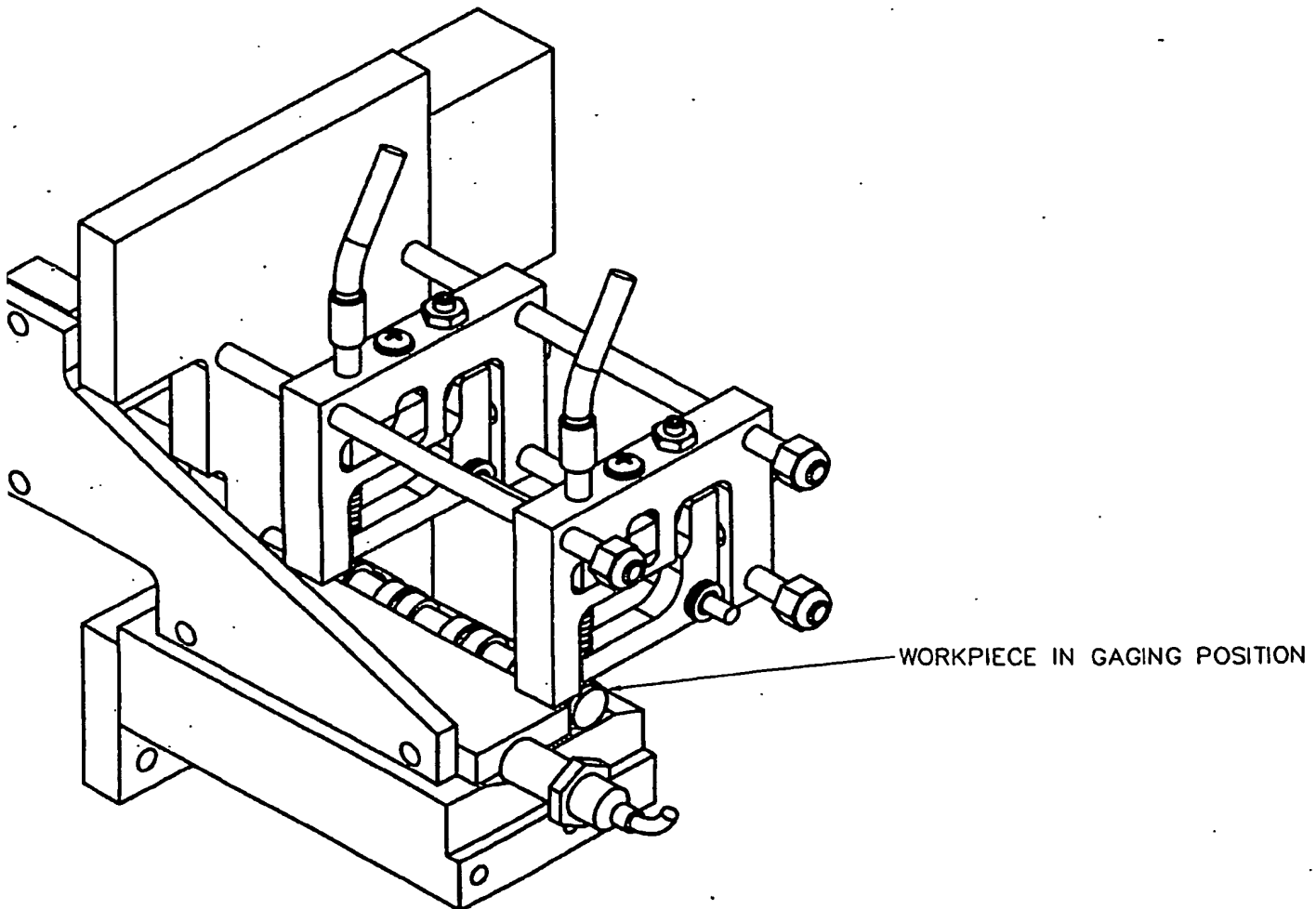


GAGE DETAIL

Fig. 3

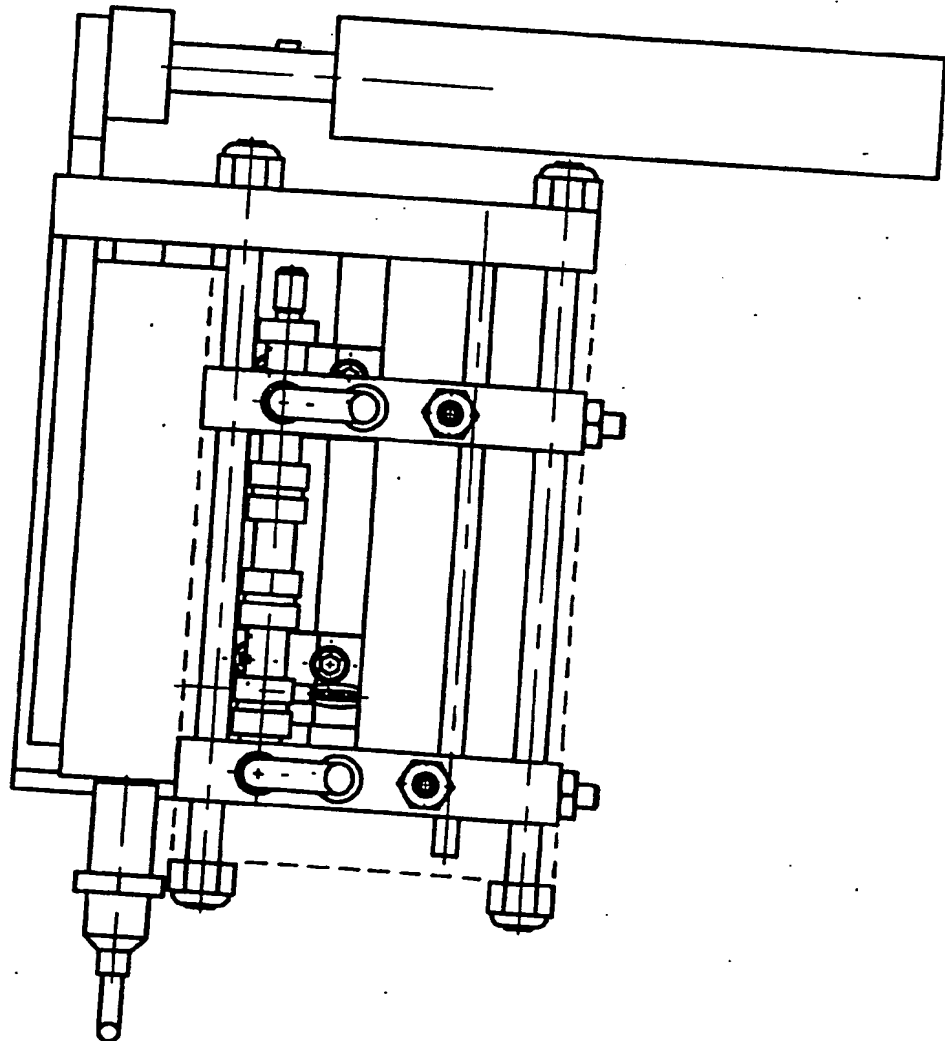
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FIG. 4



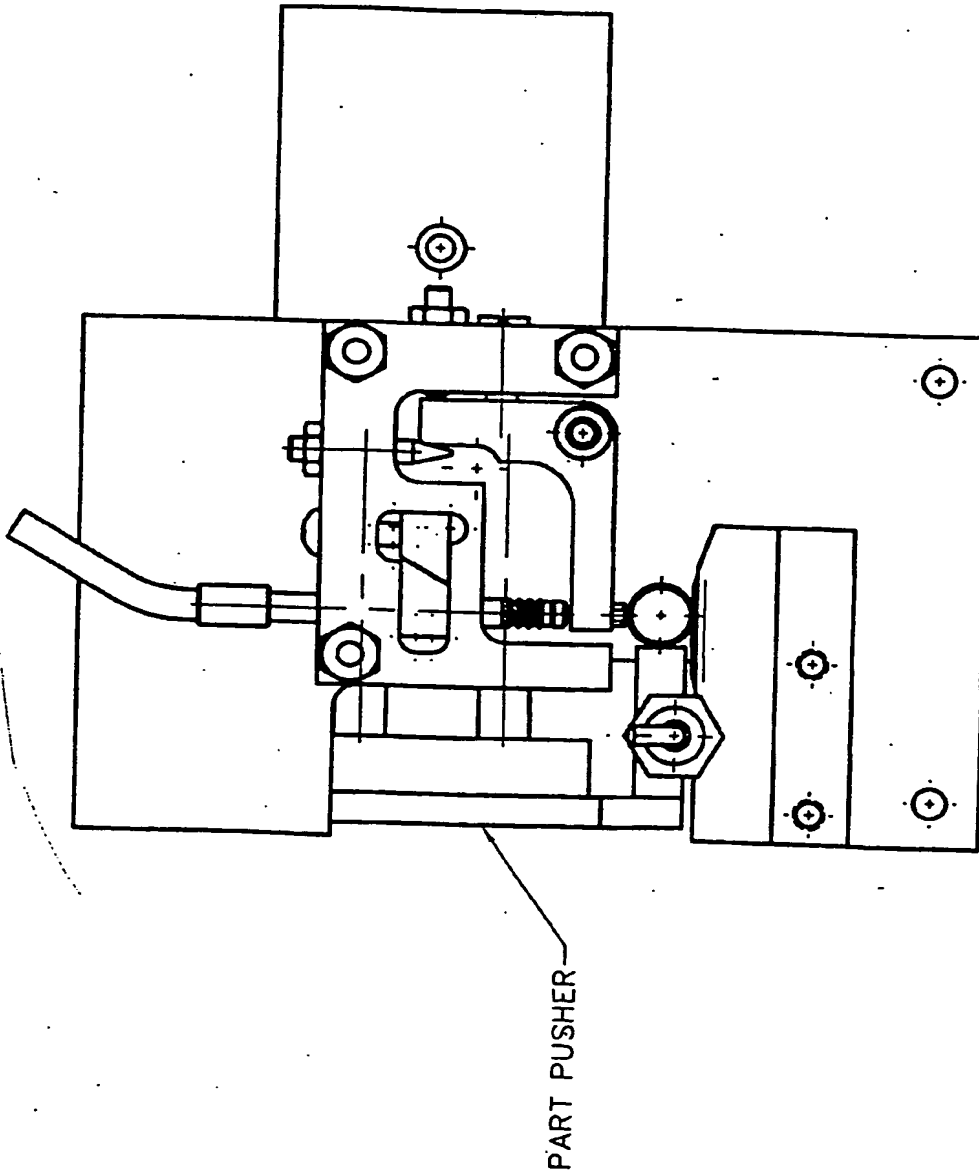
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FIG. 5



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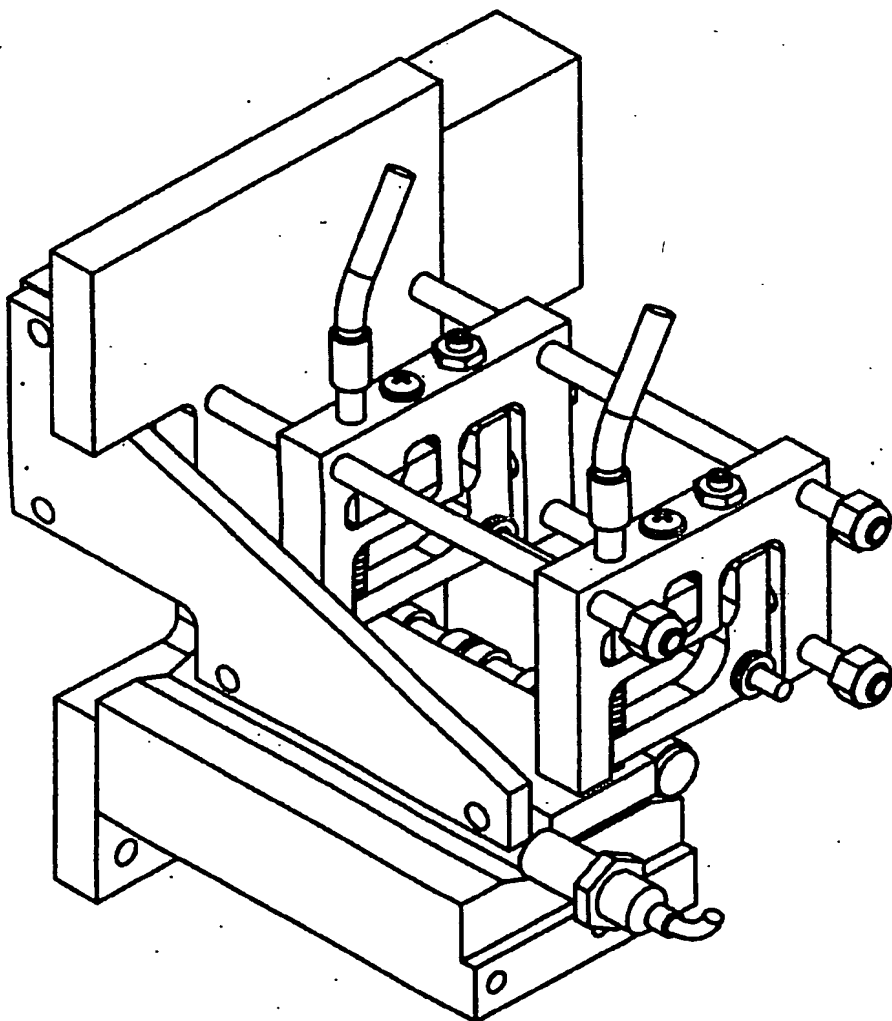
FIG. 6



PART BEING PUSHED THROUGH
GAGE BY PART HANDLING SLIDE

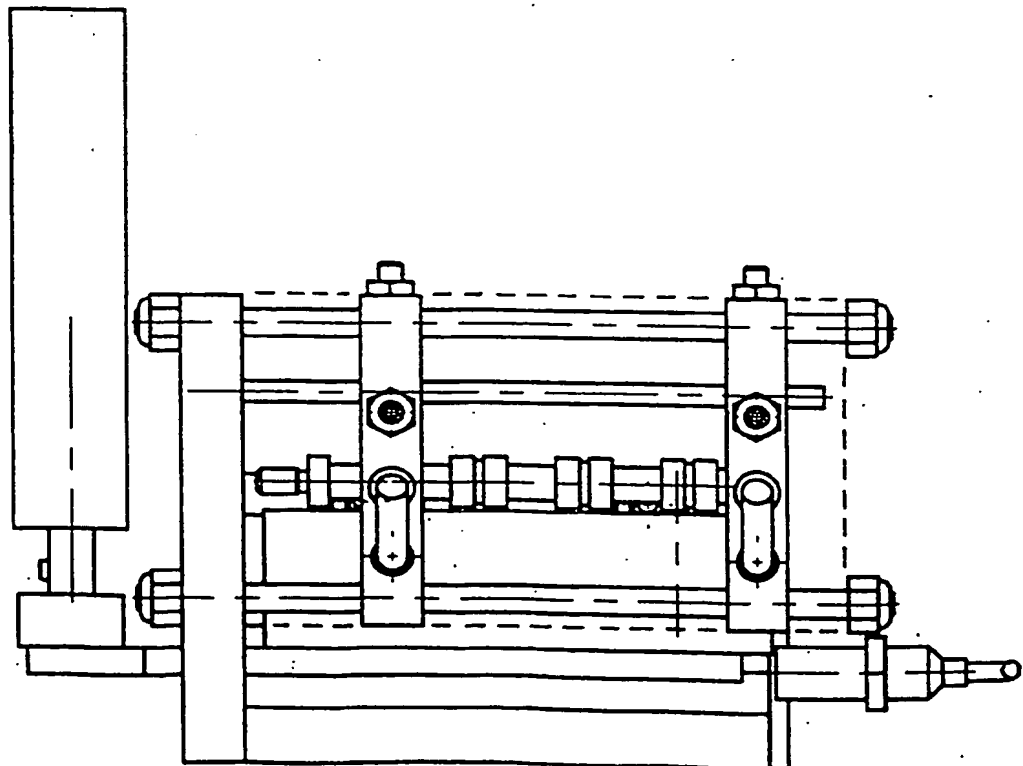
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Fig. 7



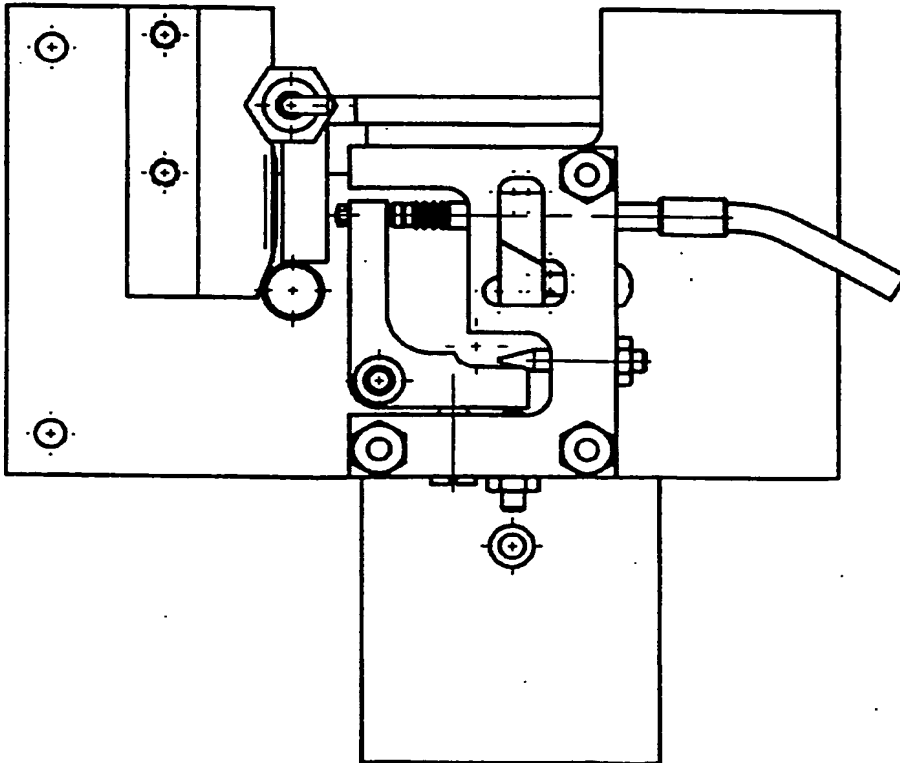
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Fig. 8



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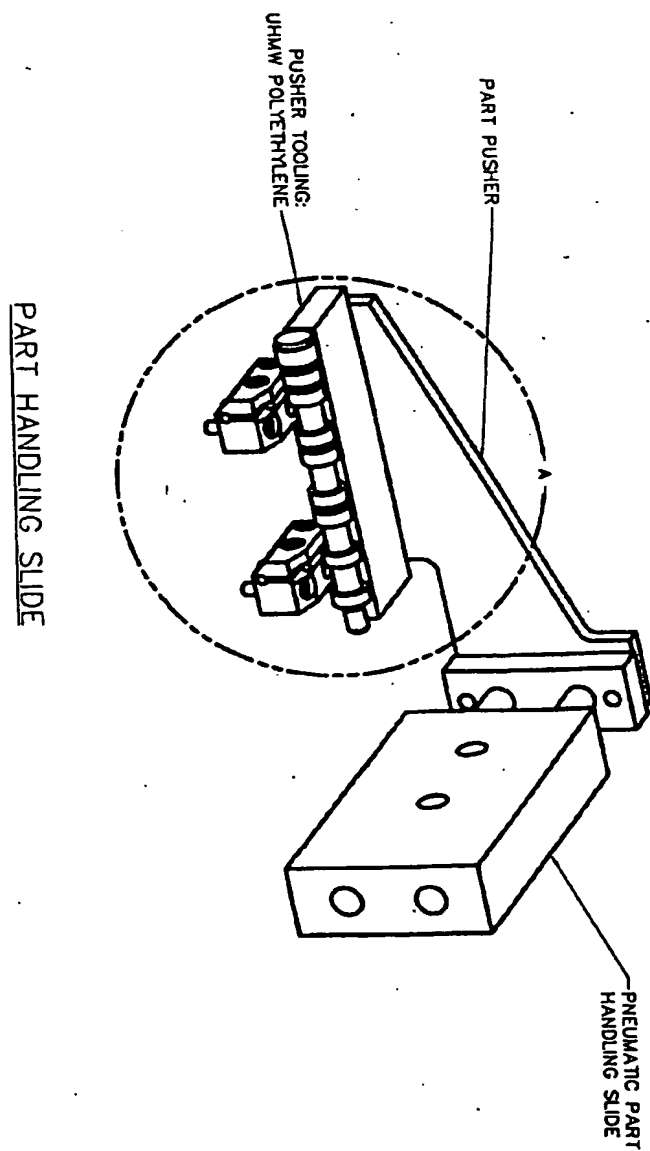
Fig. 9



PART PASSING THROUGH GAGE
TO DROP INTO RECEIVING BIN

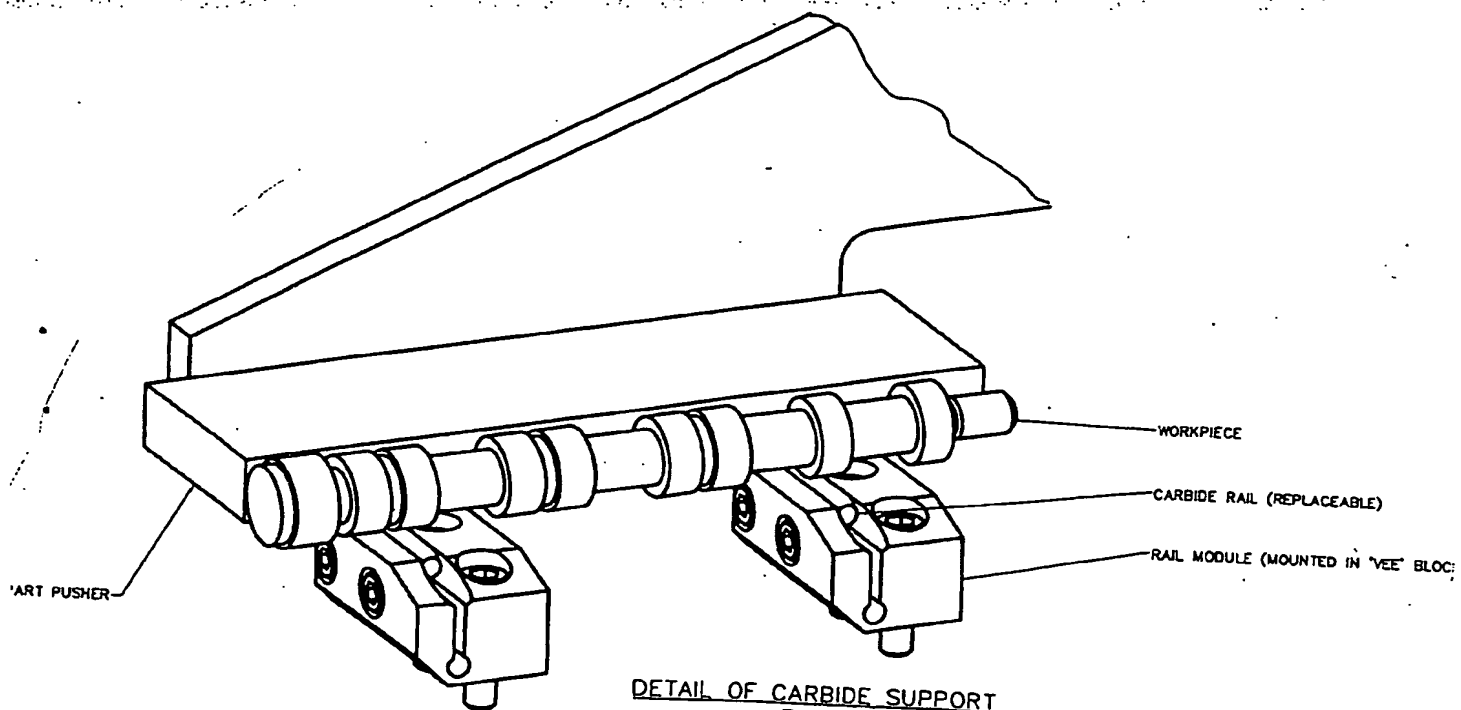
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FIG. 10



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FIG. 11



DETAIL OF CARBIDE SUPPORT
RAILS

DETAIL A
SCALE 3:1

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